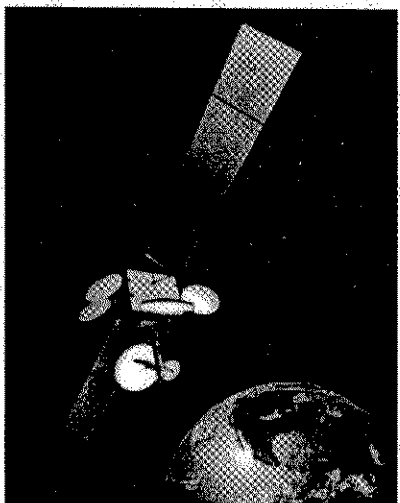


## **Space Insurance: Experience and Outlook**

**March 2002**



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**A wise person once said...**

**Good judgement comes from experience.**

**Experience comes from bad judgement.**

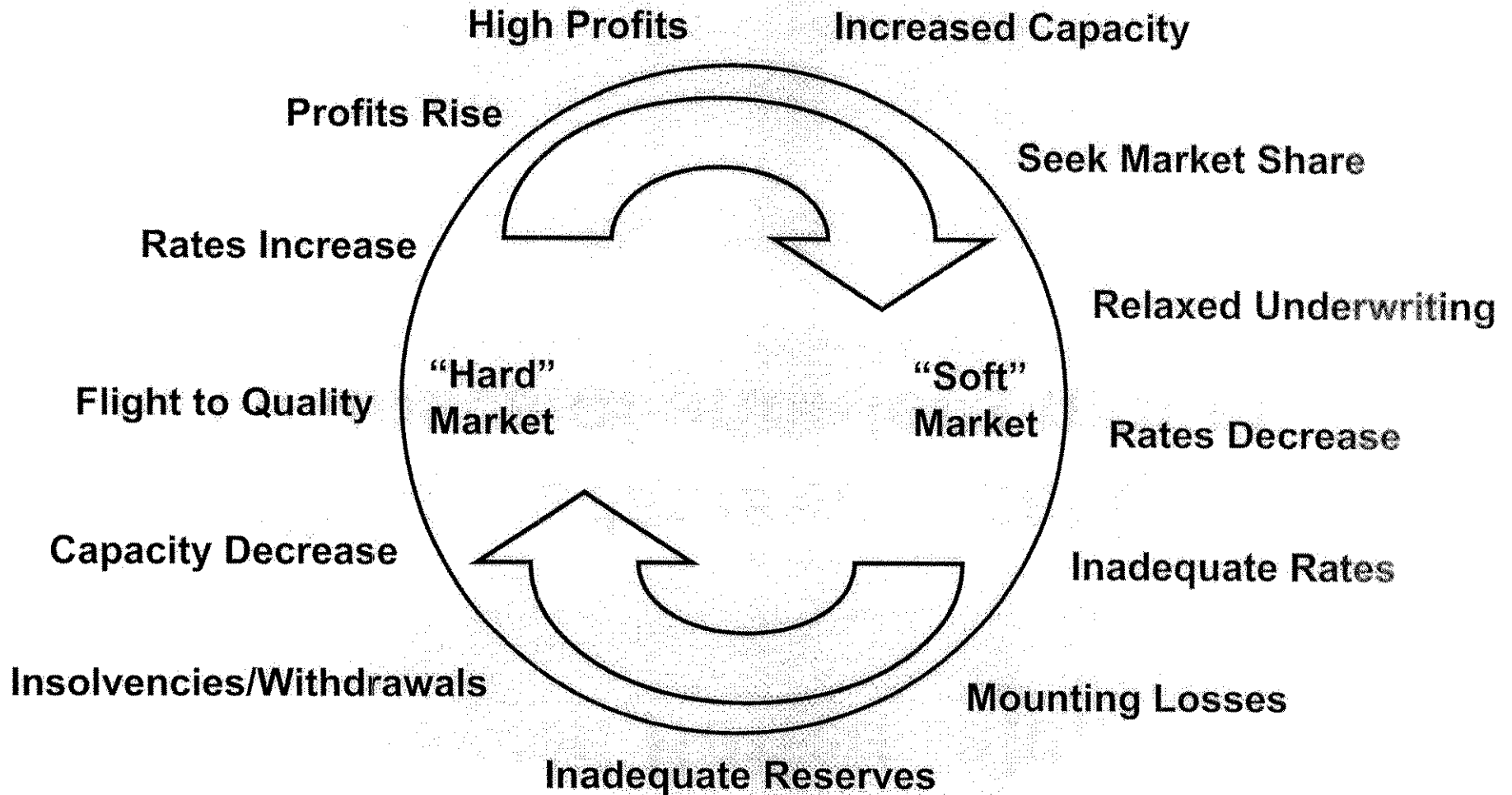
# **USAIG's Space Insurance Activity**

- **United States Aircraft Insurance Group (USAIG) was formed in 1928 to insure aviation risks**
  - » **USAIG is a pool of insurance companies**
  - » **USAIG has insured space risks since 1965**
- **U.S. Aviation Underwriters, Inc. (USAU) manages the USAIG pool**
  - » **Leader in worldwide aviation/space insurance market**
  - » **Subsidiary of General Re/Berkshire Hathaway**

# What Is Space Insurance?

- **Loss due to the failure of, or physical damage to, satellites, launch vehicles and other space payloads**
- **Coverages**
  - » Launch, initial operations, in-orbit
- **Geostationary commercial communications satellites are the core business segment**
  - » 40% of launches, 90% of in-orbit satellites, 85% of premium
- **Clients**
  - » Launch vehicle and satellite manufacturers, operators and users
- **Characteristics**
  - » Volatility (low frequency / high severity)
  - » Constantly changing technology
  - » Each risk is unique

# The Insurance Cycle



**Warren Buffett said...**

**“Nothing sedates rationality like large doses of effortless money.”**

# **Insurance Implications of 9/11/01**

- **A combination of coverages and losses never seen before — property, bodily injury, aviation, workers' compensation, life and accident and health**
  - » **Largest insured loss ever (\$50 billion ±)**
  - » **Largest aviation insurance loss ever**
  - » **Largest workers compensation insurance loss ever**
  - » **Largest property insurance loss ever**
  - » **Largest life insurance loss ever**
- **Effects far beyond WTC, Pentagon and PA**

# Largest Insurance Losses

<u>Date</u>	<u>Loss</u>	<u>Claim (\$ billion)</u>
Sep 2001	Terrorist attacks (US)	50
Aug 1992	Hurricane Andrew (US)	20
Jan 1994	Northridge earthquake (US)	16
Sep 1991	Typhoon Mireille (Japan)	7
Jan 1990	Winter storm Daria (Europe)	6
Dec 1999	Winter storm Lothar (Europe)	6
Sep 1989	Hurricane Hugo (US)	6
Oct 1987	Storm and floods (Europe)	5
Feb 1990	Winter storm Vivian (Europe)	4
Sep 1999	Typhoon Bart (Japan)	4
Nov 2001	Enron bankruptcy (US)	4

... and don't forget ...

Asbestos liability	65-122
Environmental liability (pollution)	46-56

Source: Swiss Re/sigma, Tillinghast, Morgan Stanley



# **Results of 9/11/01 - Underwriting**

- **Expected loss costs have increased**
- **Definition of risk has changed**
- **Technical risk has increased**
- **Uncertainty has increased**
- **Correlations have increased**
- **Terrorism peril has increased**
- **Prices have increased**
- **Policy conditions have become more restrictive**
- **Terrorism exclusions have been implemented**

# **Results of 9/11/01 - Financial**

- **Required capital has increased**
- **Cost of capital has increased**
- **Liquidity requirements have increased**
- **Required underwriting margins have increased**
- **Capacity has decreased**
- **Insolvencies and withdrawals have increased**
- **Scrutiny has increased**
  - » **Investors and owners**
  - » **Financial markets**
  - » **Rating agencies**
  - » **Regulators and politicians**

# Space Insurance Market

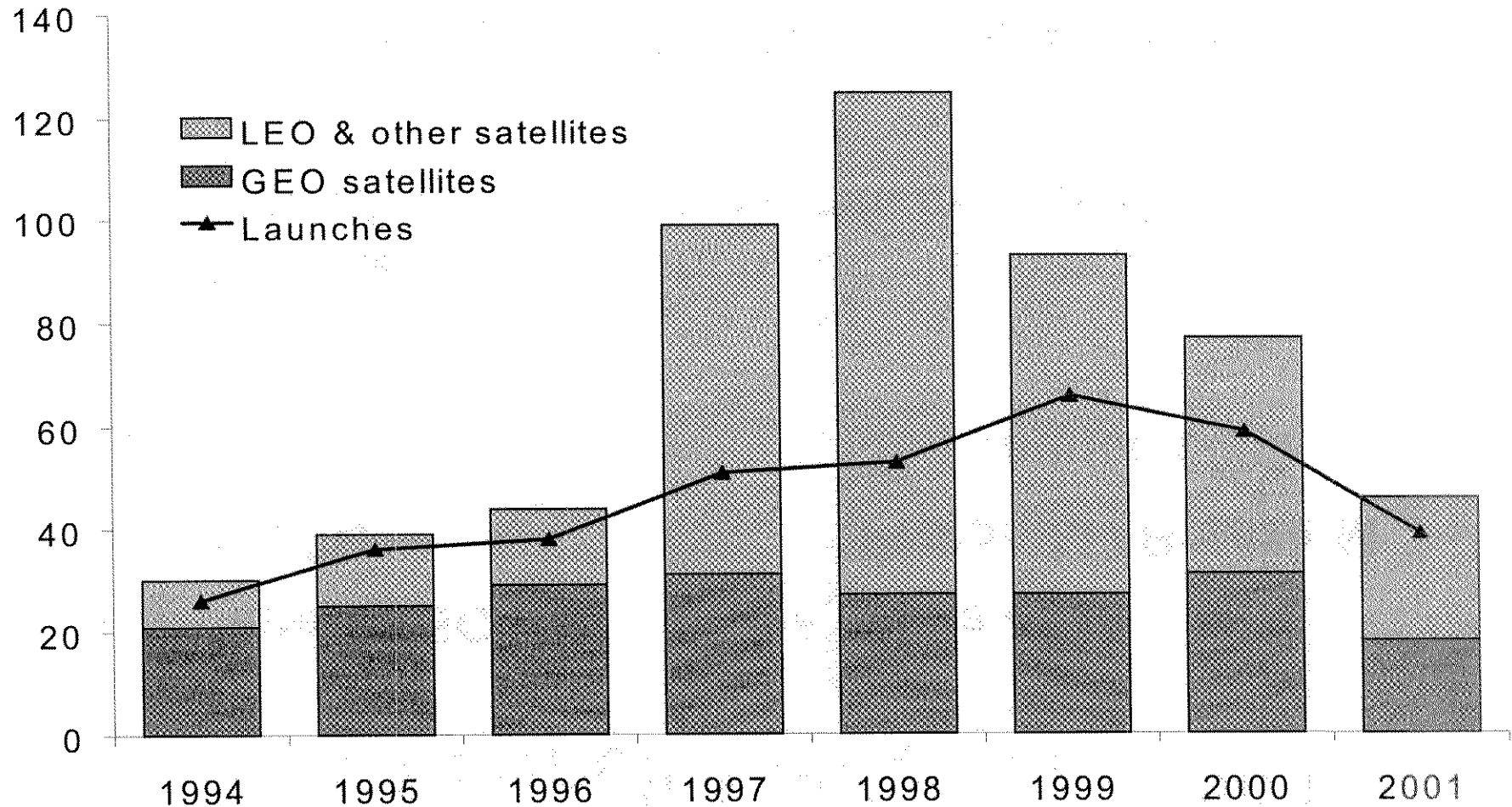
## 2001 In Review

- **Satellite launches decreased**
  - » 46 satellites launched in 2001, 77 in 2000, 93 in 1999
- **Insured values decreased**
  - » Average value of GEO satellites launched was \$193 million in 2001, \$235 million in 2000, \$212 million in 1999
- **Market space insurance premium decreased**
  - » \$0.5 billion in 2001, \$1 billion in 2000, \$1 billion in 1999
- **Satellite anomalies increased**
  - » “Generic” anomalies on certain classes of satellites
- **Market annual loss ratio increased**
  - » 251% in 2001, 107% in 2000, 91% in 1999, 156% in 1998

## **2002 So Far**

- So far this year, three insured satellites have been declared total losses, and a fourth may have suffered an anomaly that could lead to a total loss
- Based on these (potential) losses, incurred claims in first three months of 2002 exceed full year 2001 premium
- Loss ratio so far in 2002 is 720%
- Market net loss \$1.8 billion over past four years

# Insured Launch History



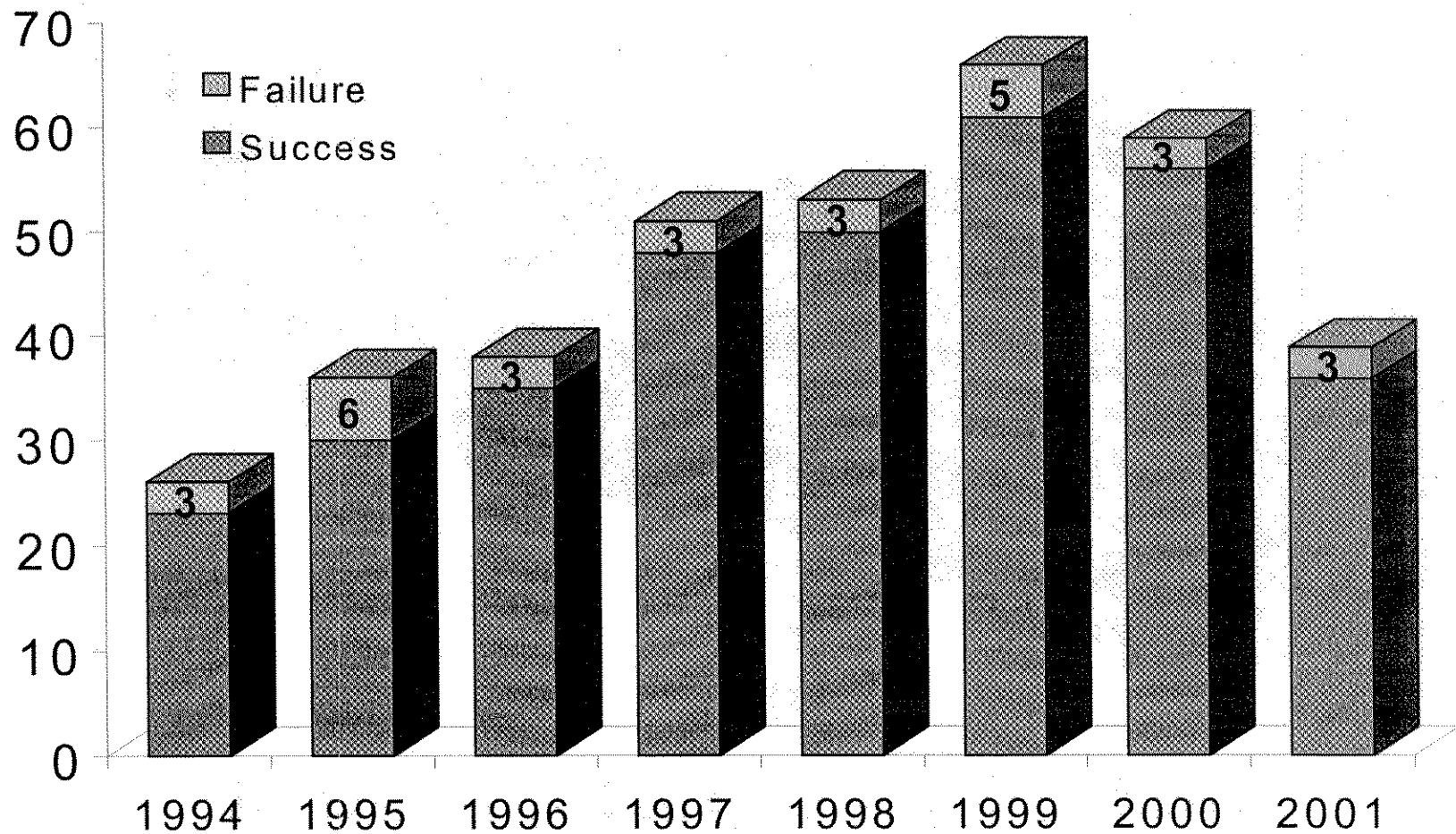
# **New Launch Vehicles in 2002**

- **Ariane 5 ESC-A**
- **Atlas 3B**
- **Atlas 5**
- **Delta 4**
- **Proton-M / Breeze-M**
- **Sea Launch 6000**

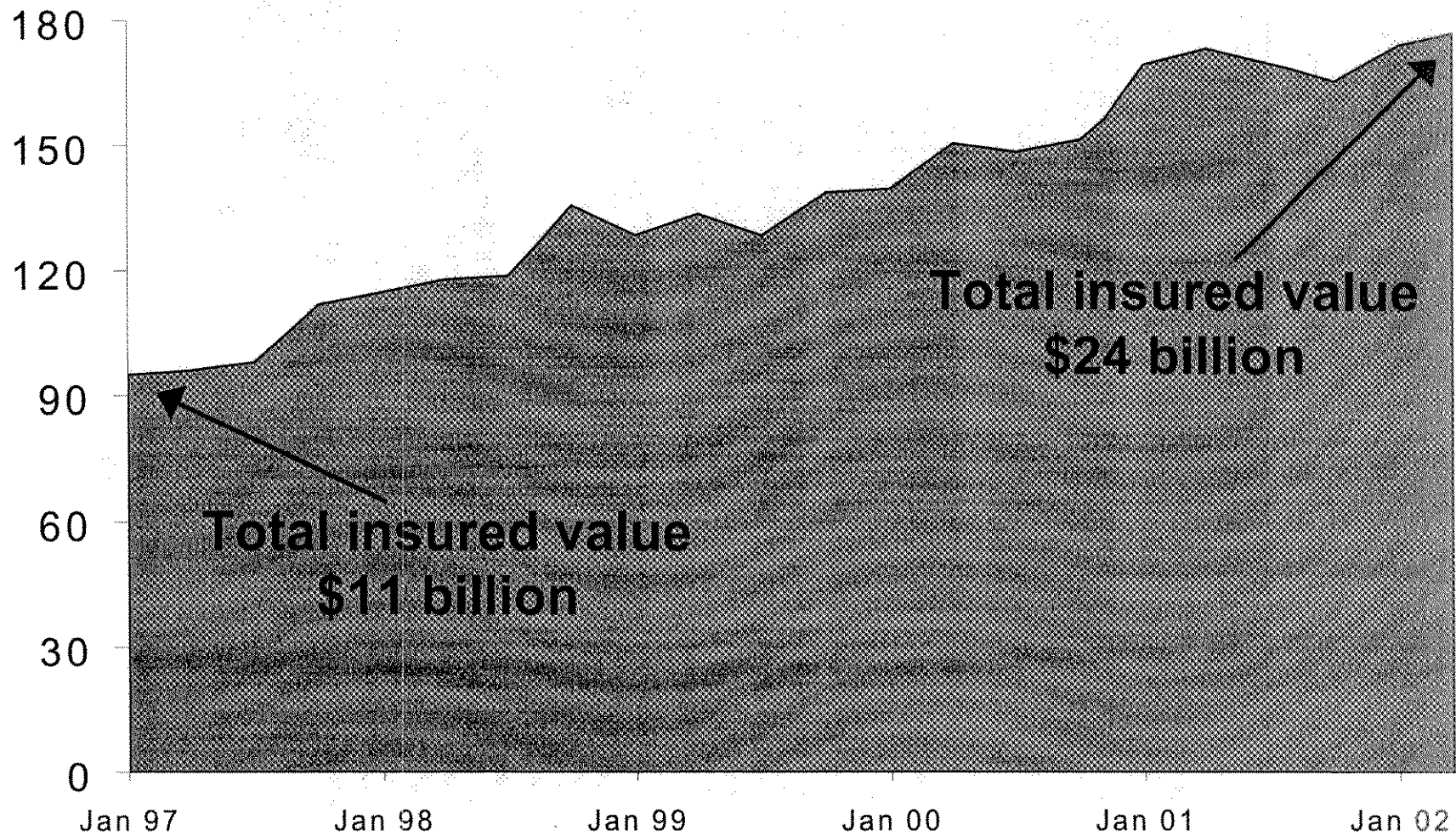
**... All of these new launch vehicles have committed insured payloads assigned to them**

**... Rule of thumb – two failures in first ten flights**

# Insured Launch Claims



# Insured Satellites In-Orbit

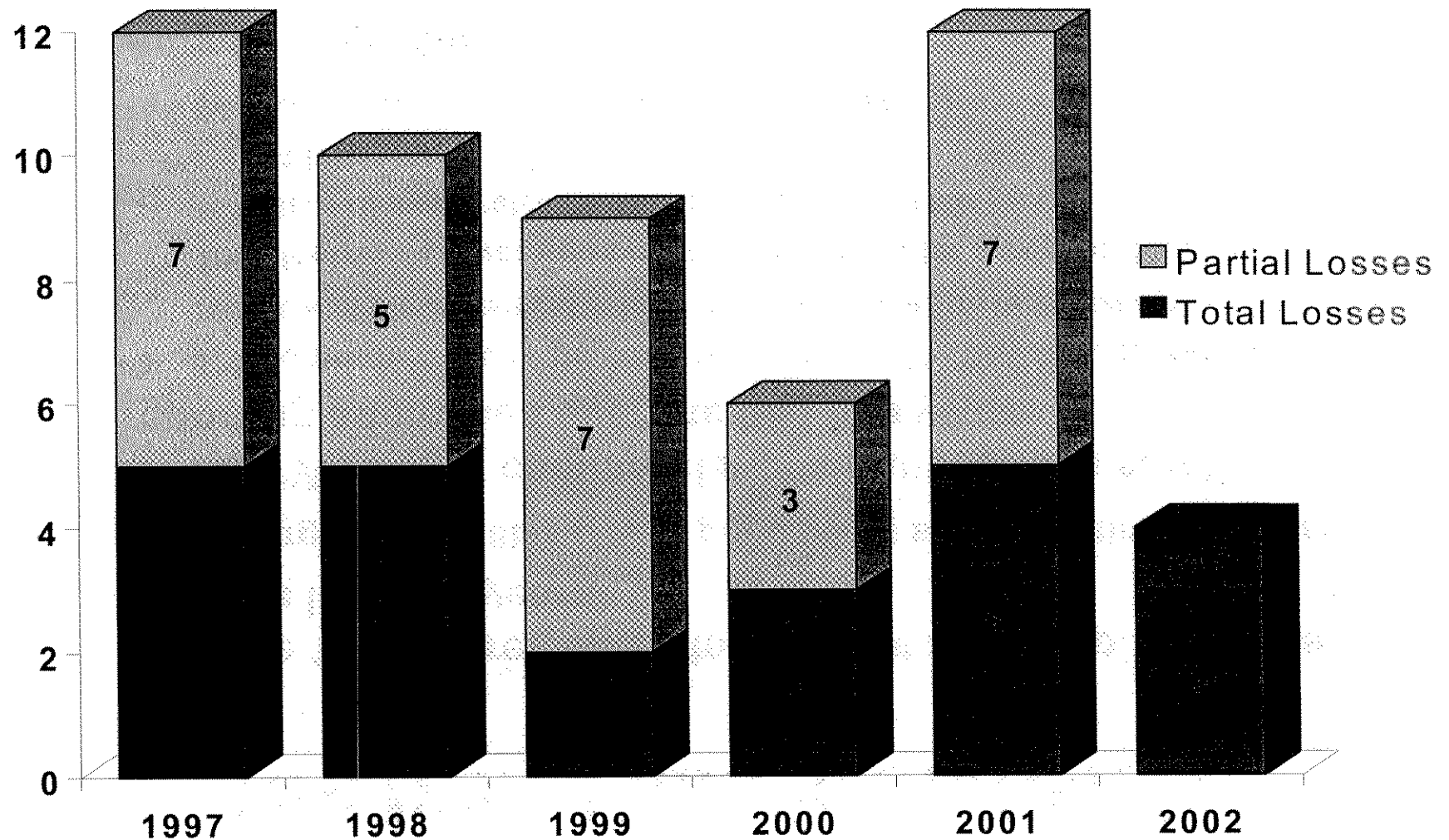




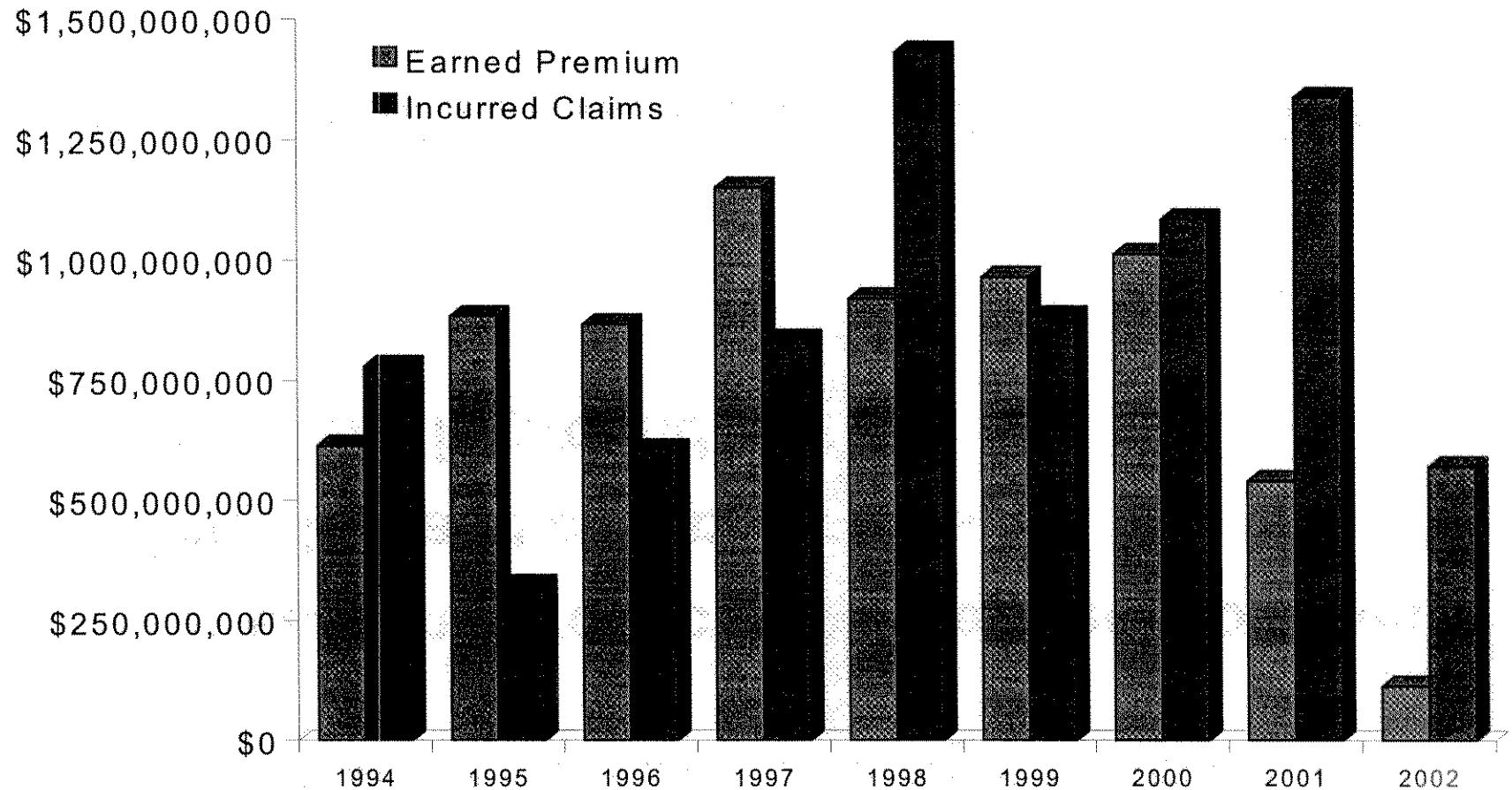
# **In-Orbit Failure Statistics**

- **Average 140 insured satellites in orbit at any point in time over the last five years**
  - » **Average 10 satellites (7% of population) suffer a claim each year**
- **Of 119 “Western” commercial communications satellites reporting anomalies over the last five years...**
  - » **225 communications payload failures (TWTA, SSPA, receiver...)**
    - 10% of these resulted in loss of capability (*i.e.*, no redundancy)
  - » **189 electrical power subsystem failures (solar array, battery...)**
    - Many of these satellites suffered reduction of life
    - 11 total losses
  - » **54 propulsion subsystem failures (thruster...)**
- **Anomaly reporting issues**
  - » **Late/no reporting**
  - » **Variation in reporting depth**

# Insured Satellite Claims



# Market Premium and Claims



# **What We Have Experienced**

- **Increase in introduction of new technologies**
- **Schedule and cost pressures**
- **Shortfalls in ground testing**

**= Unprecedented level of losses**

# What You Can Expect

- **Reduced capacity** (*especially for new technologies*)
- **Increased pricing** (*100-200% increases typical*)
- **Shorter coverage periods** (*1 year vs. 5 years*)
- **More exclusions** (*generic faults, terrorism*)
- **Higher loss thresholds** (*CTL @ 75% vs. 50%*)
- **Higher deductibles and margins** (*10-15% ded.*)
- **Risk differentiation** (*mature vs. new technology*)

# Final Thoughts

- The insurance market is battered but fundamentally sound
- The aerospace, communications and information markets are weak but will recover
- We have all suffered the consequences of bad judgement
- Let's hope that we will learn to exercise good judgement